

## 299-W11-14 (A4903) Log Data Report

### Borehole Information:

<b>Borehole:</b> 299-W11-14 (A4903)		<b>Site:</b> 216-T-33 Crib			
<b>Coordinates (WA St Plane)</b>		<b>GWL<sup>1</sup> (ft):</b> 273.9	<b>GWL Date:</b> 05/03/05		
<b>North (m)</b>	<b>East (m)</b>	<b>Drill Date</b>	<b>Ground Level Elevation (ft)</b>	<b>Total Depth (ft)</b>	<b>Type</b>
136913.962	567457.917	12/62	718.51	315	Cable

### Casing Information:

<b>Casing Type</b>	<b>Stickup (ft)</b>	<b>Outer Diameter (in.)</b>	<b>Inside Diameter (in.)</b>	<b>Thickness (in.)</b>	<b>Top (ft)</b>	<b>Bottom (ft)</b>
Welded Steel	1.55	8 5/8	8	5/16	1.55	315

### Borehole Notes:

The logging engineer measured the 8-in. casing and stickup using a steel tape. Measurements were rounded to the nearest 1/16 in. Casing depths are derived from *Hanford Wells* (Chamness and Merz 1993) that reports an 8-in. casing to 315 ft that was perforated from 250 to 313 ft. Groundwater level was measured by the logging engineer at 273.9 ft from the top of casing (TOC). *Hanford Wells* reports depth to water at 255.8 ft (depth reference unknown) in 1992.

### Logging Equipment Information:

<b>Logging System:</b> Gamma 4E	<b>Type:</b> SGLS (70%) SN: 34TP40587A
<b>Calibration Date:</b> 04/05	<b>Calibration Reference:</b> DOE/EM-GJ854-2005
	<b>Logging Procedure:</b> MAC-HGLP 1.6.5, Rev. 0

### Spectral Gamma Logging System (SGLS) Log Run Information:

<b>Log Run</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4 Repeat</b>	
Date	05/03/05	05/04/05	05/05/05	05/05/05	
Logging Engineer	Spatz	Spatz	Spatz	Spatz	
Start Depth (ft)	120.0	200.0	273.0	200.0	
Finish Depth (ft)	2.0	119.0	201.0	173.0	
Count Time (sec)	100	100	100	100	
Live/Real	R	R	R	R	
Shield (Y/N)	N	N	N	N	
MSA Interval (ft)	1.0	1.0	1.0	1.0	
ft/min	N/A <sup>2</sup>	N/A	N/A	N/A	
Pre-Verification	DE771CAB	DE781CAB	DE791CAB	DE791CAB	
Start File	DE771000	DE781000	DE791000	DE791073	
Finish File	DE771118	DE781081	DE791072	DE791100	

Log Run	1	2	3	4 Repeat	
Post-Verification	DE771CAA	DE781CAA	DE791CAA	DE791CAA	
Depth Return Error (in.)	0	0	0	- 2	
Comments	Fine gain adjustment after files 048, -077, 096.	No fine gain adjustment.	No fine gain adjustment.	No fine gain adjustment.	

### **Logging Operation Notes:**

Logging was conducted with a centralizer on the sonde. Logging data acquisition is referenced to TOC. No data were collected below groundwater. A repeat section was collected in this borehole to evaluate system performance.

### **Analysis Notes:**

<b>Analyst:</b>	Henwood	<b>Date:</b>	05/10/05	<b>Reference:</b>	GJO-HGLP 1.6.3, Rev. 0
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Pre-run and post-run verifications for the logging system were performed before and after each day's data acquisition. The acceptance criteria were met.

A casing correction for 0.3125-in.-thick casing was applied to the log data.

SGLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated with an EXCEL worksheet template identified as G4Eapr05.xls using efficiency functions and corrections for casing, water, and dead time as determined from annual calibrations. No corrections for dead time or water were necessary.

### **Log Plot Notes:**

Separate log plots are provided for the man-made radionuclide ( $^{137}\text{Cs}$ ) detected in the borehole, naturally occurring radionuclides ( $^{40}\text{K}$ ,  $^{238}\text{U}$ ,  $^{232}\text{Th}$  [KUT]), a combination of man-made, KUT, and dead time, and total gamma plotted with dead time. For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable level (MDL) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, casing corrections, or water corrections.

Historical gross gamma logs acquired in 1968 and 1976 and derived from Additon et al. (1978) were re-digitized and included for comparison with the current log data. A repeat log section is also included.

### **Results and Interpretations:**

$^{137}\text{Cs}$  was the man-made radionuclide detected in this borehole.  $^{137}\text{Cs}$  was detected near the ground surface between 2 and 7 ft; the maximum concentration was measured at approximately 0.3 pCi/g.  $^{137}\text{Cs}$  was also detected at a few sporadic locations throughout the borehole near the MDL of approximately 0.2 pCi/g.

Historical gross gamma logs showed no elevated gamma activity attributable to man-made radionuclides in 1968 or 1976 and are consistent with the background activity observed in the current SGLS total gamma profile. Relatively high activity indicated at approximately 105 ft is the result of elevated KUT.

The repeat section generally indicates good agreement of the naturally occurring KUT. Enhanced radon is indicated in the repeat  $^{238}\text{U}$  profile. Radon was observed during each day's logging except for log run 2 conducted on May 4, 2005.

### **References:**

Additon, M.K., K.R. Fecht, T.L. Jones, and G.V. Last, 1978. *Scintillation Probe Profiles From 200 East Area Crib Monitoring Wells*, RHO-LD-28, Rockwell Hanford Operations, Richland, Washington.

Chamness, M.A., and J.K. Merz, 1993. *Hanford Wells*, PNL-8800, Pacific Northwest Laboratory, Richland, Washington.

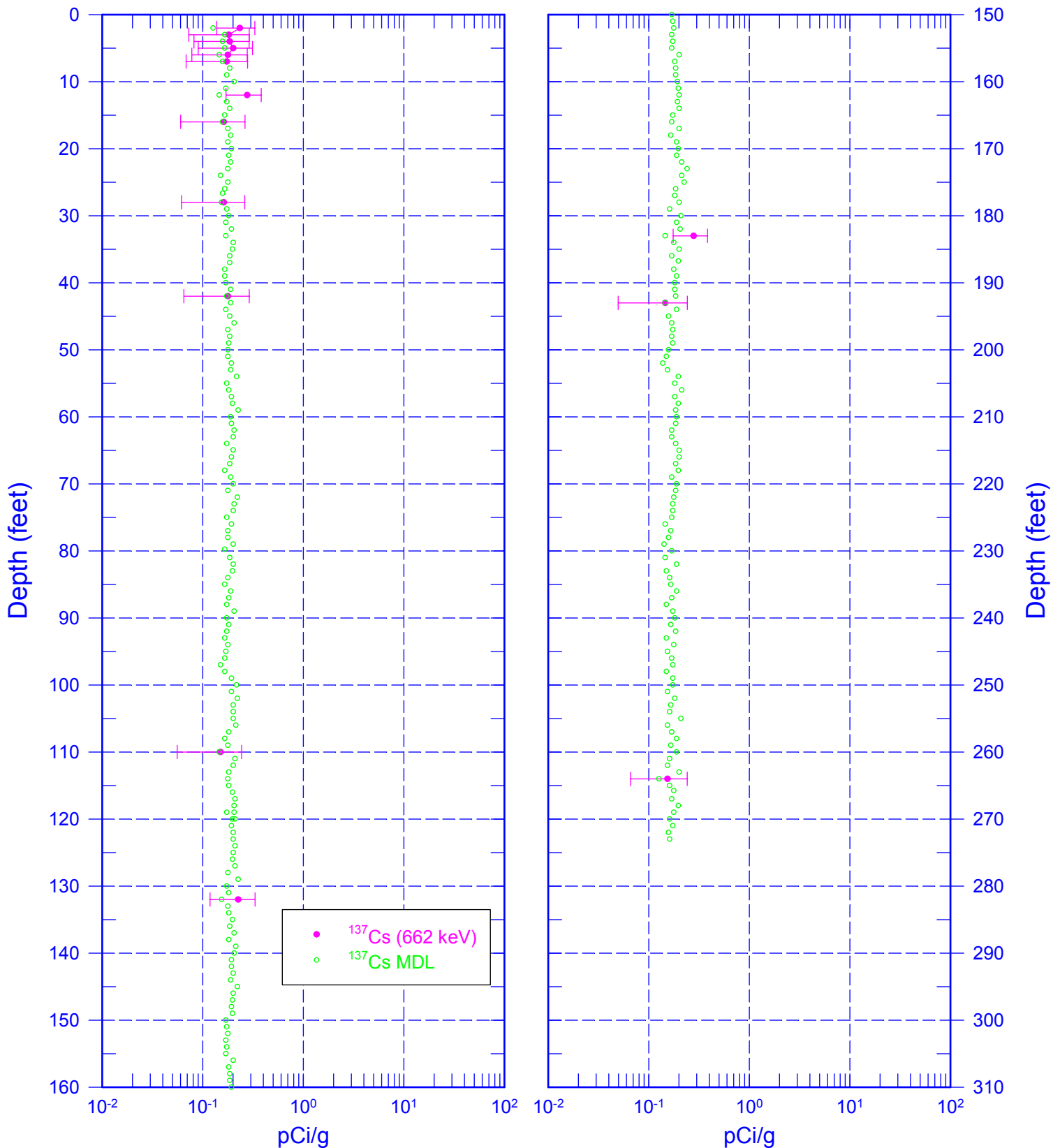
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<sup>1</sup> GWL – groundwater level

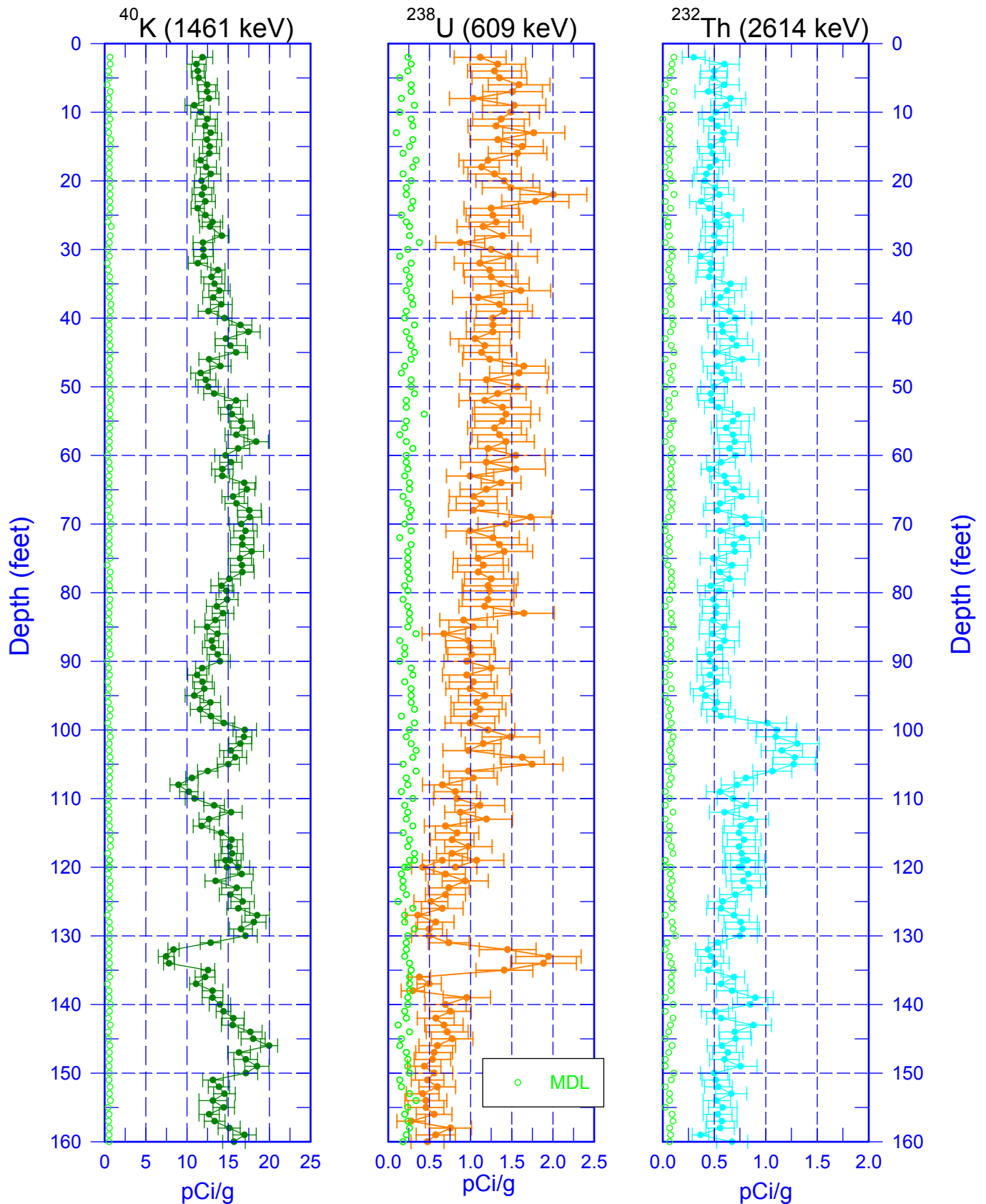
<sup>2</sup> N/A – not applicable

# 299-W11-14 (A4903)

## Man-Made Radionuclides



# 299-W11-14 (A4903) Natural Gamma Logs



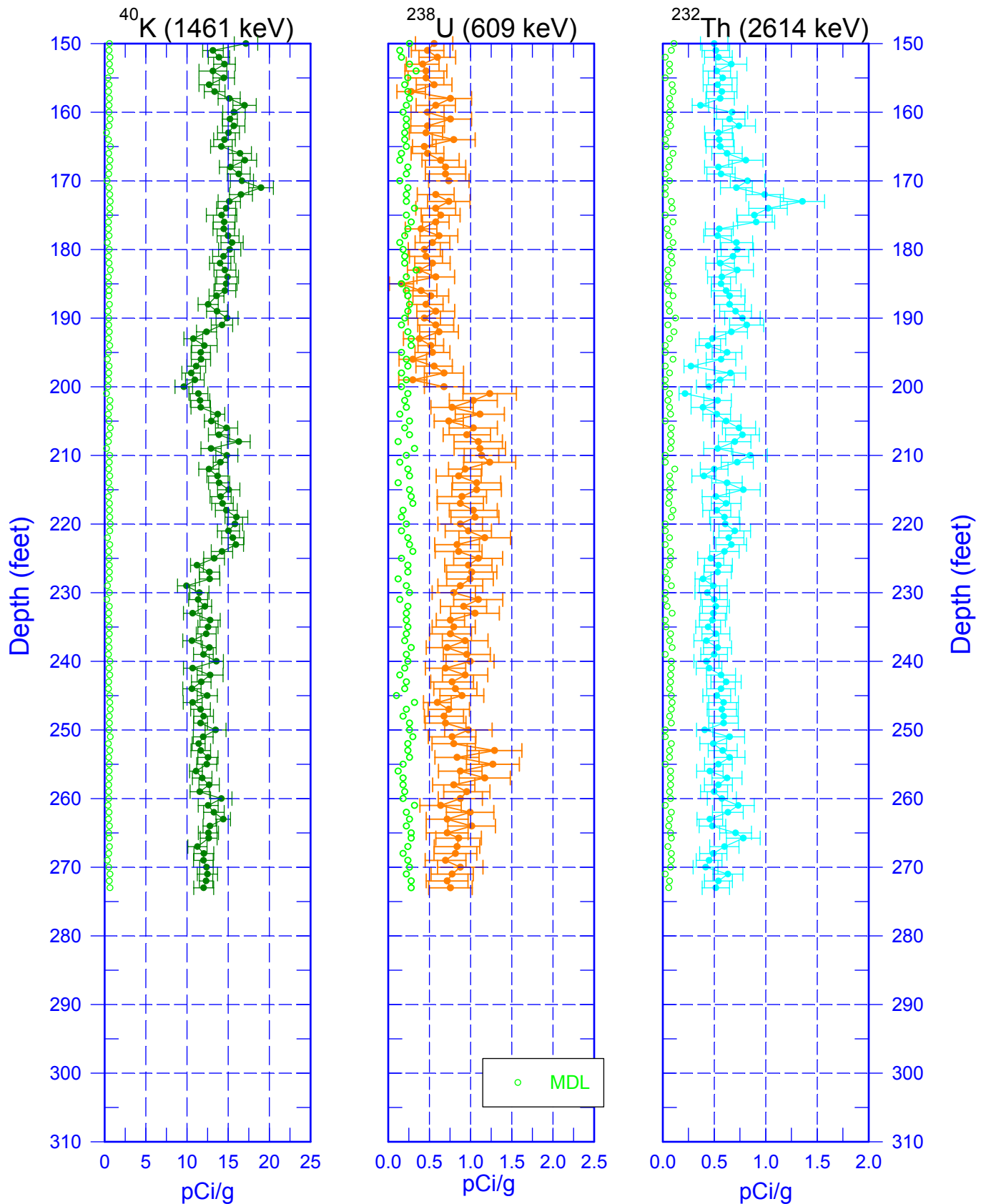
Zero Reference = Top of Casing

Depth scale: 1" = 20 ft

Last Log Date - 05/05/05

# 299-W11-14 (A4903)

## Natural Gamma Logs

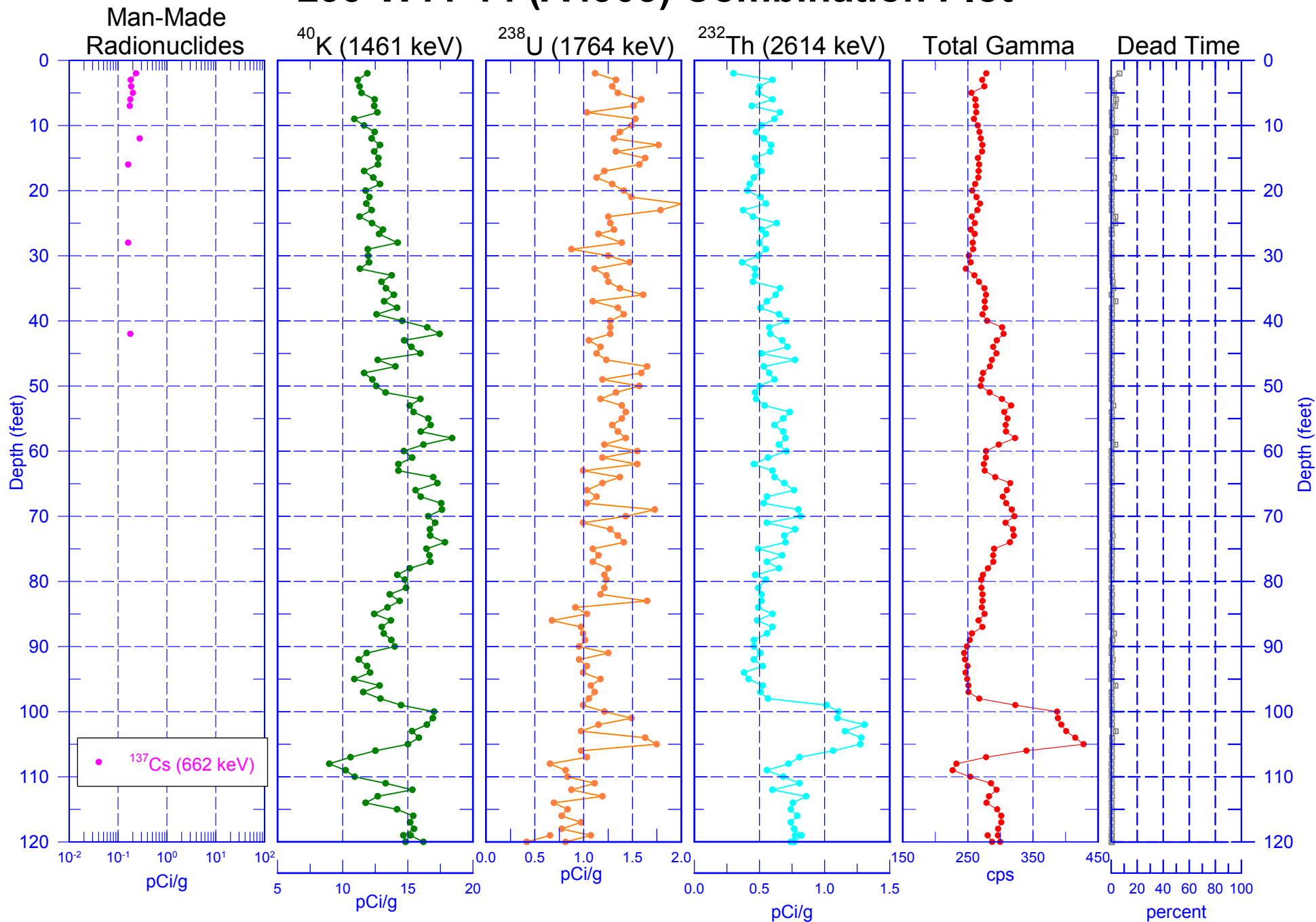


Zero Reference = Top of Casing

Depth scale: 1" = 20 ft

Last Log Date - 05/05/05

# 299-W11-14 (A4903) Combination Plot

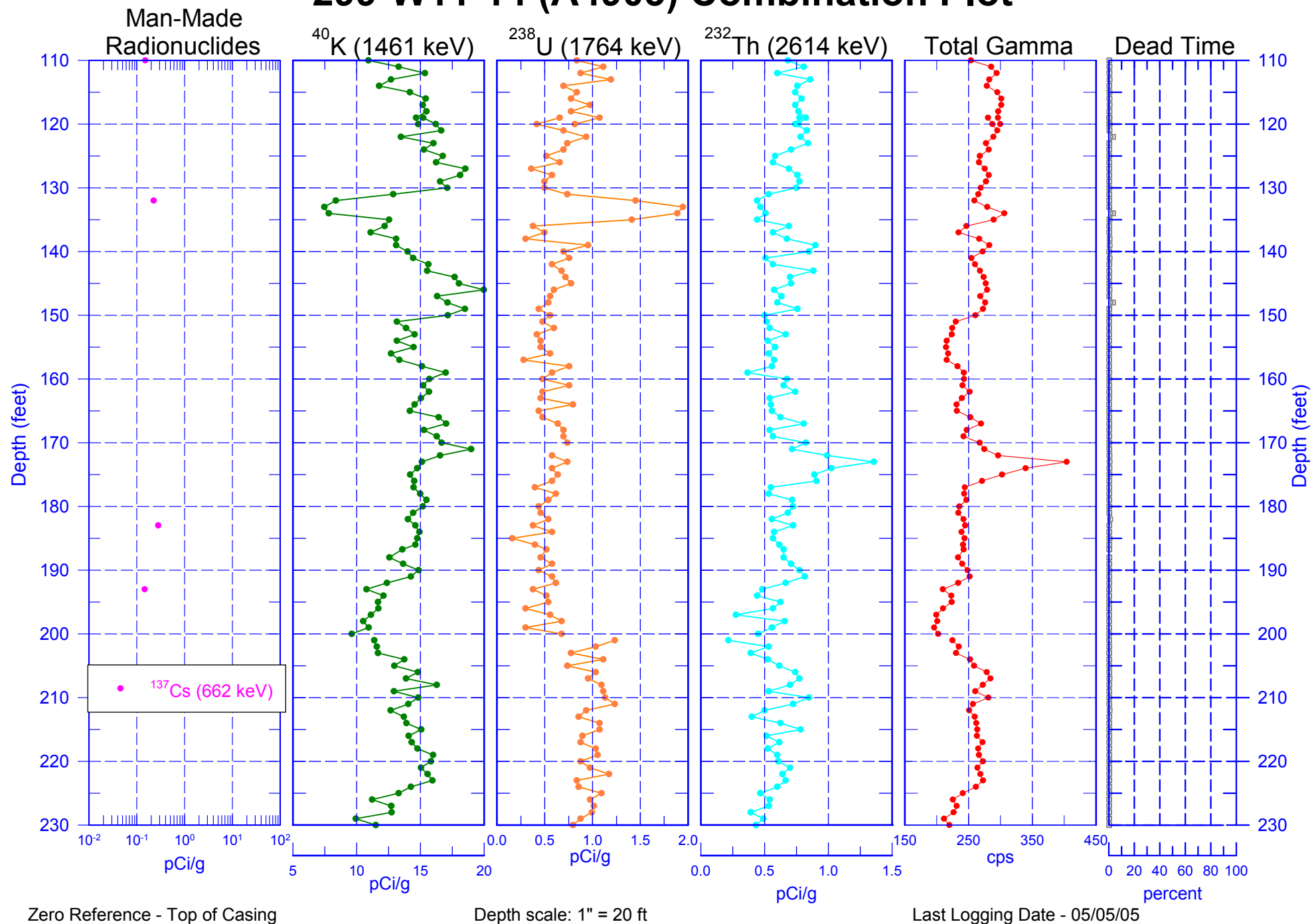


Zero Reference - Top of Casing

Depth scale: 1" = 20 ft

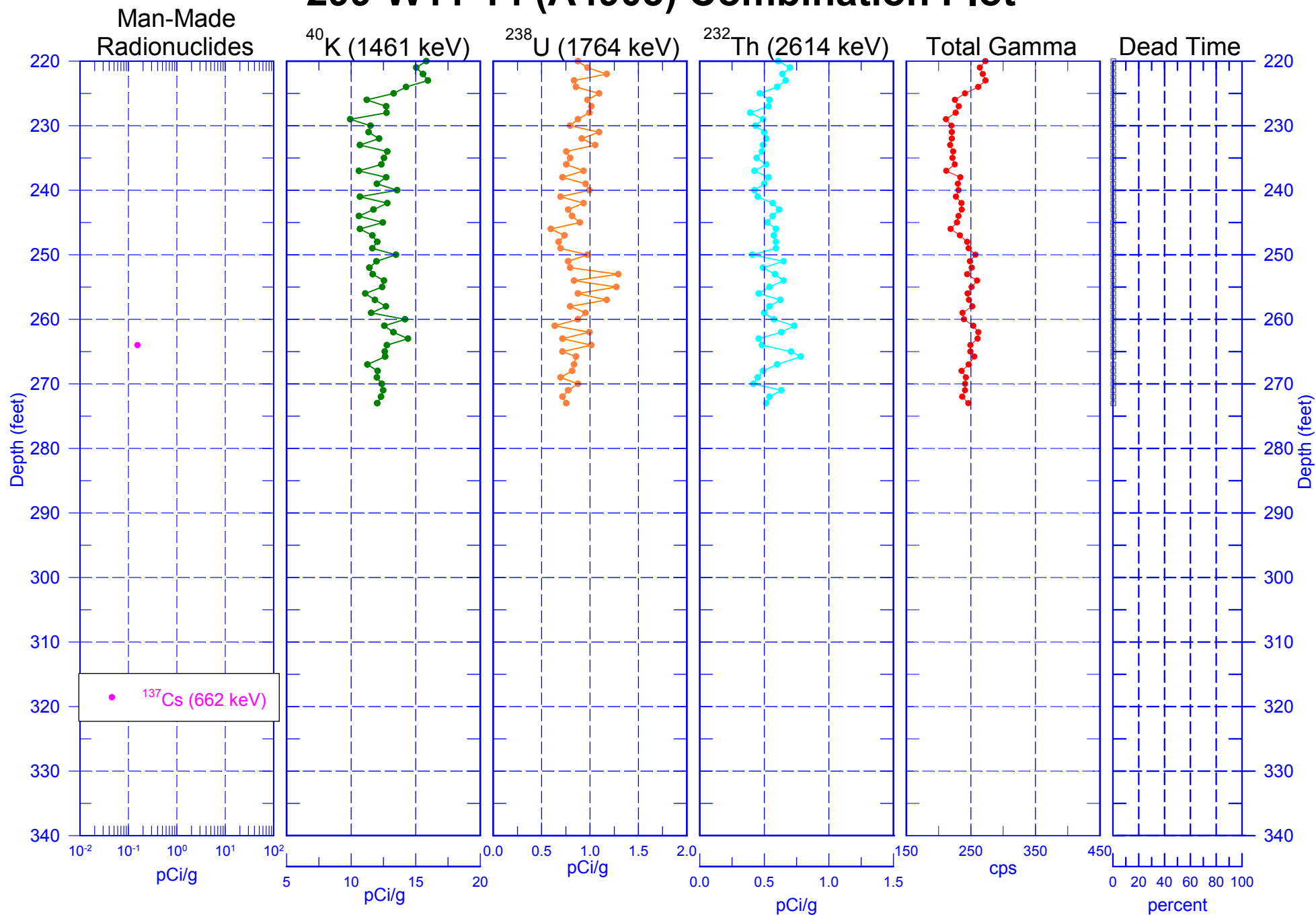
Last Logging Date - 05/05/05

## 299-W11-14 (A4903) Combination Plot



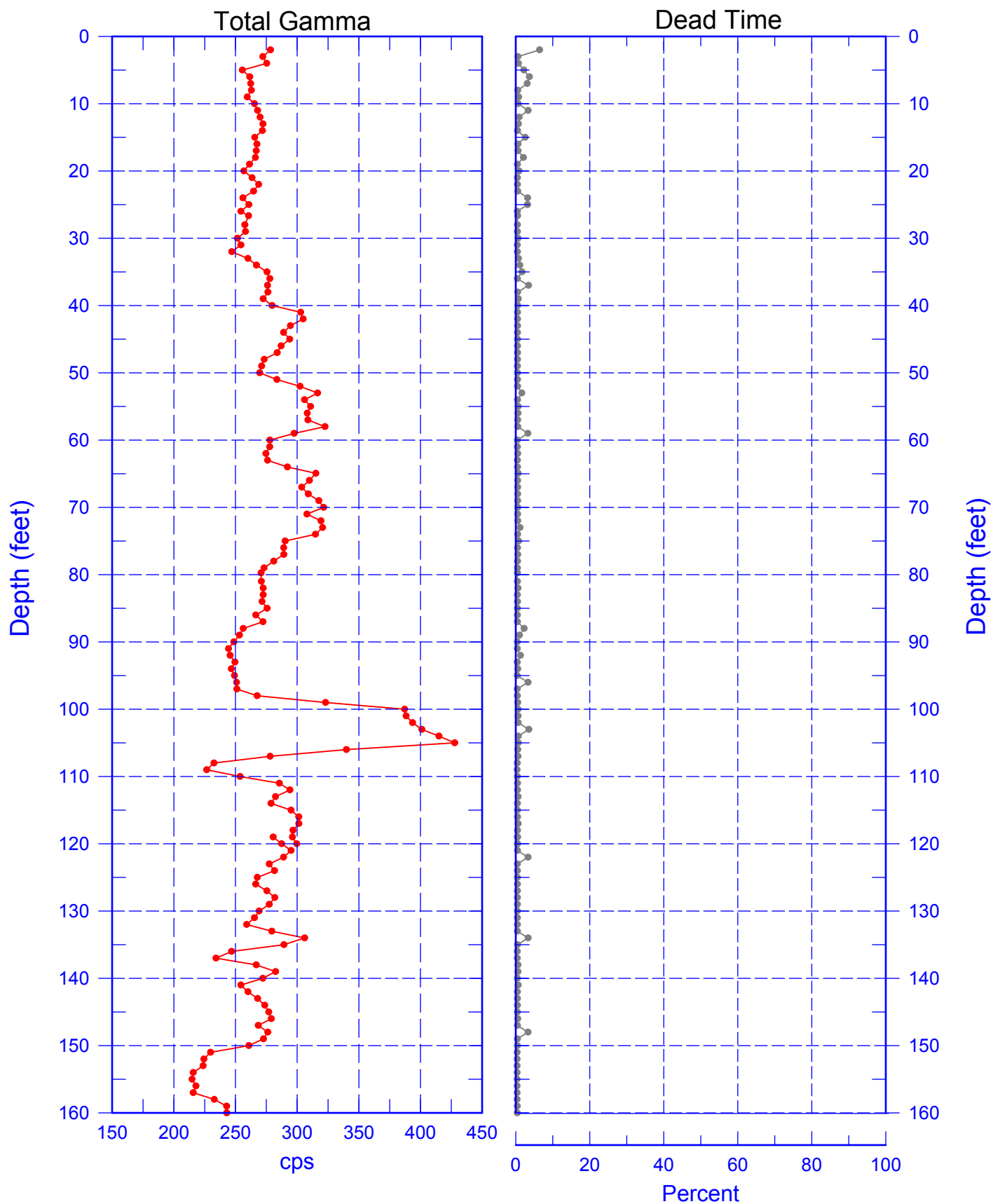


# 299-W11-14 (A4903) Combination Plot



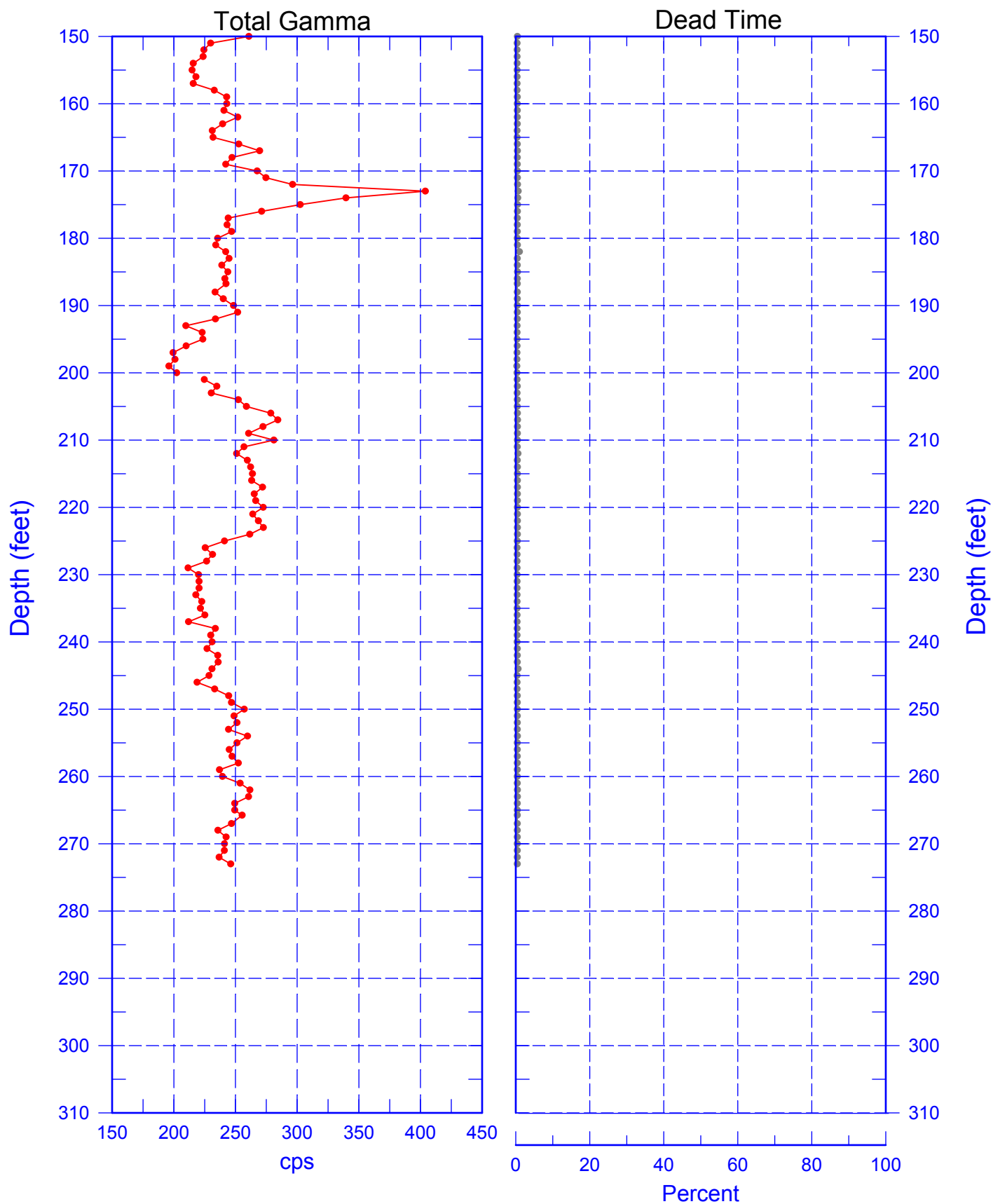
# 299-W11-14 (A4903)

## Total Gamma & Dead Time



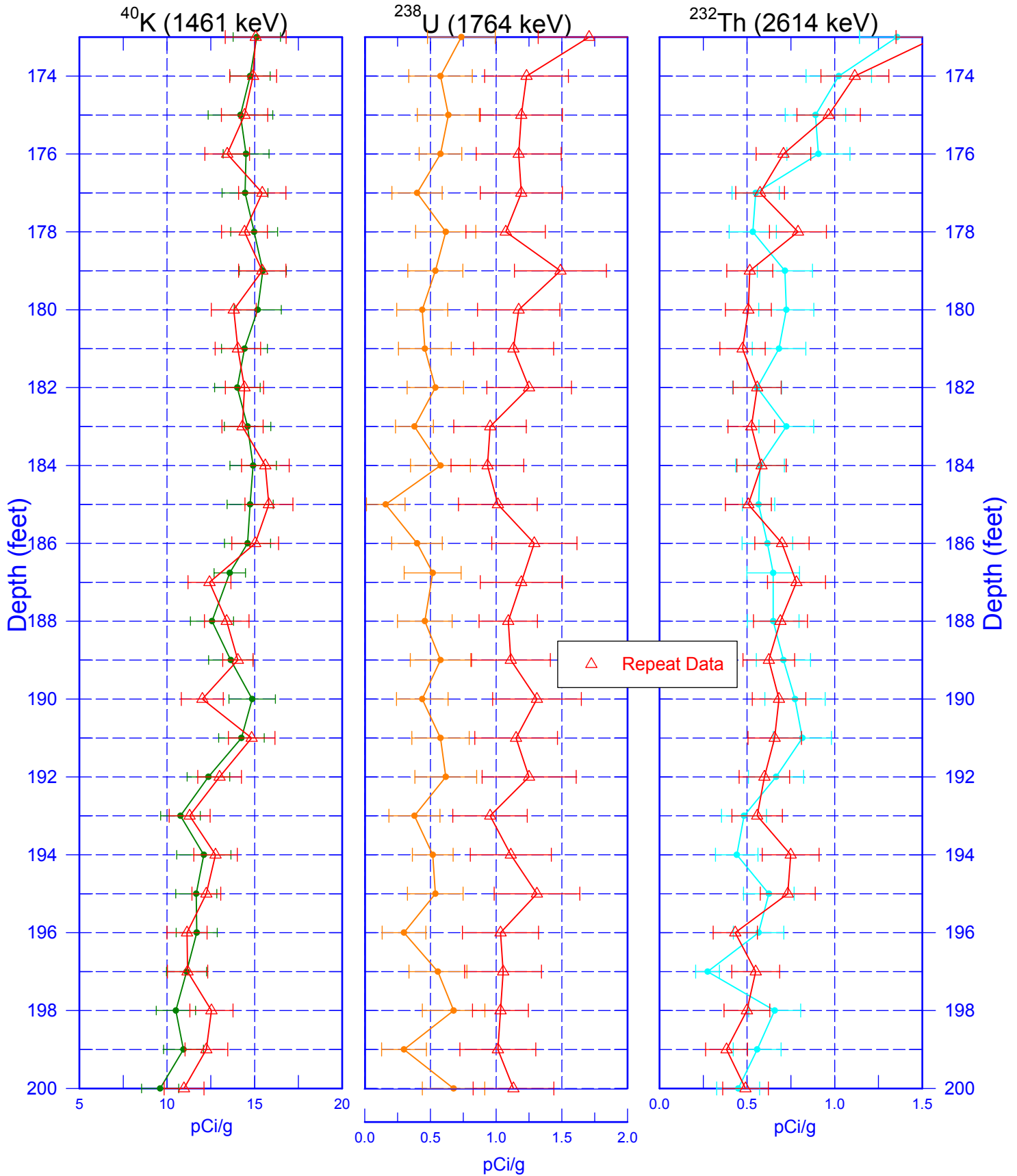
# 299-W11-14 (A4903)

## Total Gamma & Dead Time



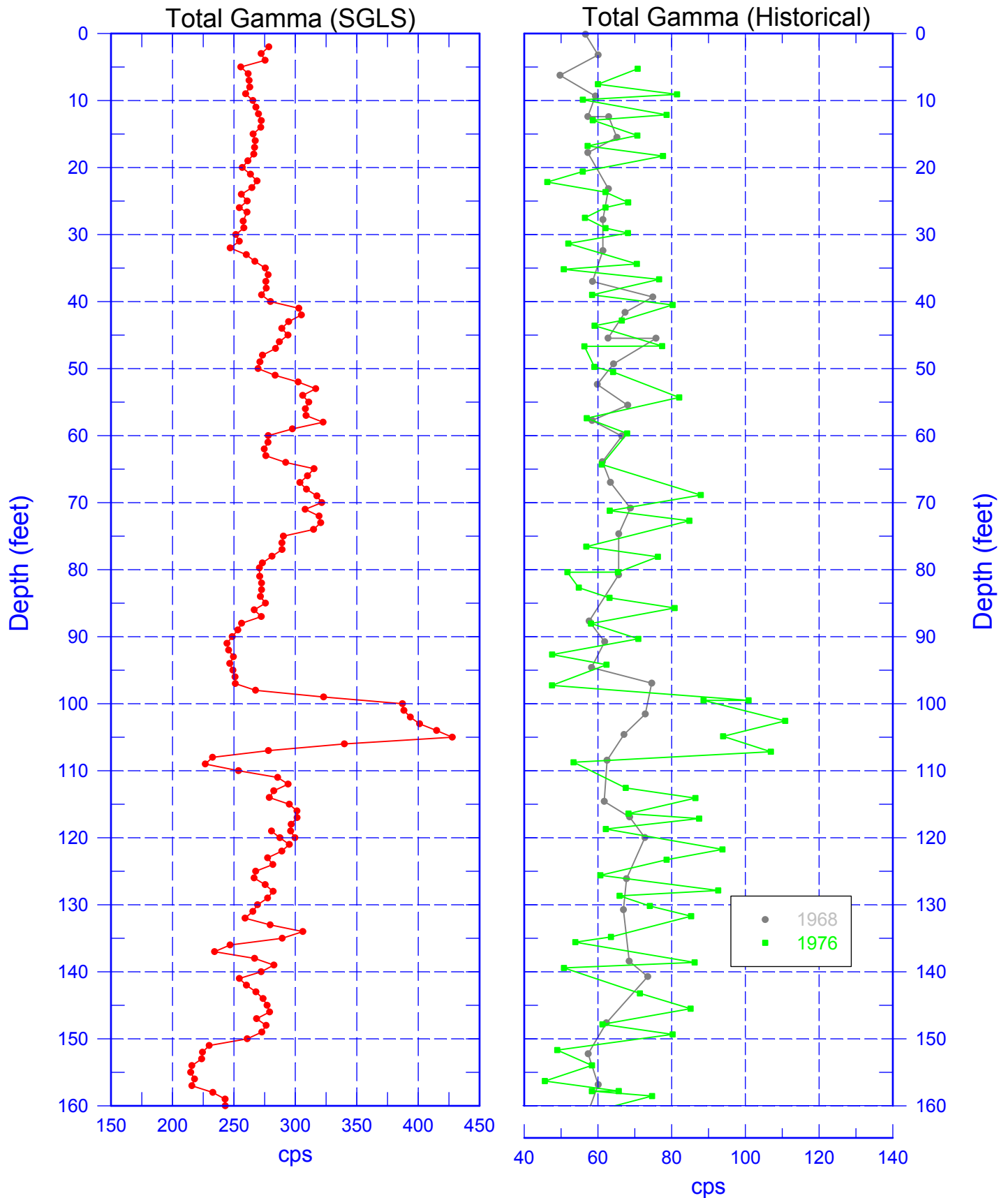
# 299-W11-14 (A4903)

## Repeat Section of Natural Gamma Logs



# 299-W11-14 (A4903)

## Comparison of Historical and SGLS Total Gamma



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## Comparison of Historical and SGLS Total Gamma

